Finding Room for Improvement in Transition Metal Oxides Cathodes for Lithium-ion Batteries

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Energy storage using rechargeable lithium-ion batteries has become an integral part of our modern lifestyle. They have been used or are being considered for use in a wide range of applications from portable electronics to vehicular applications. Since the commercialization of $LiCoO_2$, other layered transition metal oxide variants (*e.g.* NMC and NCA) have drawn major interest from battery companies. However, it is important to address performance and safety aspects and minimize the cobalt content in the material for reasons of cost and toxicity. These issues are particularly important for large-scale applications. Some of our work focuses on reducing the amount of cobalt in NMCs through metal substitution, without compromising their electrochemical properties. We present here some results and challenges toward improving these mixed layered transition metal oxides.

Acknowledgment

This work was supported by the Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Vehicle Technologies of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.